

CLAIMS

What is claimed is:

1. A method for measuring the concentration of reactable silanol groups on a silica surface comprising the steps of:
 - f) contacting a silica surface with a silanol titration solution, wherein said titration solution comprises a detectable and quantifiable titration reagent that binds with substantially all reactable silanol groups on the silica surface;
 - g) allowing said titration reagent to bind substantially all of the silanol groups on the silica surface;
 - h) removing the silanol titration solution from the silica surface, along with substantially all of the titration reagent that has not bound to a reactable silanol group, under conditions where titration reagent that has bound to a silanol group remains bound;
 - i) detecting and quantifying the bound detection reagent, after optionally eluting the bound detection reagent from the silica surface; and
 - j) determining the concentration of reactable silanol groups on said silica surface from the quantity of bound titration reagent.
- 2) The method of claim 1, wherein the titration reagent binds substantially all reactable silanol groups on the silica surface in a manner that is substantially stoichiometric, and wherein the known binding stoichiometry between said titration reagent and reactable silanol groups is used to calculate the concentration of reactable silanol groups on said silica surface.
- 3) The method of claim 2, wherein the binding stoichiometry between the titration reagent and the reactable silanol groups is known.
- 4) The method of claim 3, wherein the binding stoichiometry is 1:1.
- 5) The method of claim 1, wherein the silica surface comprises fused silica.
- 6) The method of claim 1, wherein the silica surface comprises the channel surface of a capillary.

- 7) The method of claim 1, wherein said titration reagent binds to said reactable silanol groups through an ionic interaction.
- 8) The method of claim 1, wherein said titration reagent is small enough such that the binding of a first titration reagent to a reactable silanol group on said silica surface does not substantially block any other reactable silanol groups on said silica surface from reaction with a second titration reagent.
- 9) The method of claim 1, wherein said titration reagent has a MW of less than 500 Da.
- 10) The method of claim 1, wherein said titration reagent comprises a quaternary alkyl ammonium group.
- 11) The method of claim 10, wherein said titration reagent is benzyltrimethylammonium.
- 12) The method of claim 1, wherein said titration reagent comprises a chromophore which is used to detect and quantify the bound titration reagent, optionally after elution of the reagent from the silica surface.
- 13) The method of claim 12, wherein said chromophore absorbs UV radiation.
- 14) The method of claim 1, wherein the binding reaction between said titration reagent and a reactable silanol group is reversible, and wherein bound titration reagent is eluted from the silica surface between steps (c) and (d).
- 15) The method of claim 1, wherein the silica surface is washed to substantially remove the silanol titration solution from the silica surface prior to detection and quantification of bound titration reagent.
- 16) The method of claim 14, wherein said titration reagent comprises a quaternary alkyl ammonium group and a UV chromophore, wherein the silica surface is washed to substantially remove the silanol titration solution from the silica surface prior to detection and quantification of bound titration reagent, and wherein the titration reagent is detected by absorbance of UV light.
- 17) The method of claim 16, wherein said titration reagent is benzyltrimethylammonium.